

COVID-19 adversely affects the psychological status of healthcare workers in the emergency room

Psychological effects of COVID-19 in emergency room

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Abstract

Aim: During the 2019 coronavirus disease (COVID-19) pandemic, healthcare workers experience intense levels of workload and pressure. The exact psychological and mental impacts of this pandemic on healthcare workers and relevant factors remain to be elucidated. Therefore, this study aimed to investigate the stress and anxiety of healthcare workers due to COVID-19.

Material and Methods: This prospective multi-centered survey-based study was conducted on 205 participants working in the emergency room (ER) of two hospitals between May 15 and May 22, 2020. Besides demographic data such as age, gender, working history in ER, marital status and presence of children, the Perceived Stress Scale (PSS) and the Beck Anxiety Inventory (BAI) were used in the questionnaire. Data were analyzed by either the Kruskal-Wallis test and Mann-Whitney U test, Chi-square test or Fisher's exact test.

Results: Most of the participants were nurses (35.5%), and 53.2% of all participants were male. The rate of COVID-19 infection among physicians and nurses was significantly higher than among personnel in other occupations. The rate of the willingness of physicians and nurses to receive psychiatric support was significantly higher than that of other personnel ($p < 0.05$). Physicians and nurses had higher BAI and PSS scores than other staff, and scores of nurses were significantly higher than physicians ($p < 0.05$).

Discussion: During the pandemic, the adverse psychological and mental impacts of COVID-19 were prevalent among the healthcare workers. Adequate measures at both organizational and national levels are required to improve the psychological state of frontline healthcare workers during the COVID-19 pandemic.

Keywords

Anxiety; COVID-19; Depression; Healthcare workers; Stress

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Introduction

Coronavirus disease 2019 (COVID-19) that was emerged in China in December 2019, has been listed as Public Health Emergency of International Concern by the World Health Organization (WHO) in January 2020 [1] and as a pandemic in March [2]. Psychological distress and socioeconomic dilemma have arisen worldwide. Besides stress and anxiety in the population because of the restrictions on social activities and limitations on nearly all unessential movements due to the quarantine in most of the countries, healthcare professionals continued to implement their services for extensive amounts of critically ill patients and emergency cases.

Various psychological issues and mental problems including anxiety, depression, disappointment and unpredictability have arisen due to COVID-19 [3]. Undoubtedly, this is one of the stressful events worldwide and especially for healthcare workers at the frontline in the hospitals due to the overwhelming psychological burden, which is most likely caused by intense working conditions, being at a great risk of exposure, fear of carrying the infectious pathogen to their families, extensively altered working environments and long shifts [4, 5].

The literature regarding the psychological and mental consequences of COVID-19 on healthcare workers is rapidly increasing. As previously indicated, the effect of the COVID-19-related psychological and mental situations may lead to long-lasting issues [6] and due to the vulnerability of the healthcare professionals to physical and mental exhaustion, fear, insomnia, depression and anxiety, substance and alcohol use and even suicide may be encountered [7, 8]. In this study, our primary aim was to investigate the stress and anxiety levels of the healthcare workers of emergency room (ER) in a tertiary pandemic hospital and the secondary aim was to provide suggestions to reduce the anxiety and stress in these workers.

Material and Methods

Study Design and Participants

This prospective multi-centered, survey-based study was approved by the Ethics Committee of Sisli Hamidiye Etfal Research and Training Hospital (Date: 12/05/2020, No: 2788). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The authors have complied with the international guidelines, the "Regulations on Pharmaceutical Research," enforced by the Ministry of Health of Turkey, published in the 27089 numbered Official Journal dated 23 December 2008, and also with other regulations published at a later date. The study was conducted on 205 participants between May 15 and May 22, 2020, online. The study included participants who worked in the ERs of Sisli Hamidiye Etfal Research and Training Hospital and Sariyer Hamidiye Etfal Research and Training Hospital during the pandemic, while ER workers who did not actively work and whose questionnaire were incomplete or workers who did not answer the questionnaire were not included in the study. Besides demographic data such as age, gender, working history in ER, marital status and presence of children, the Perceived Stress Scale (PSS) [9, 10] and the Beck Anxiety Inventory (BAI)

[11] were used in the questionnaire. In the PSS, each item is scored on a 5-point Likert scale ranging between 0 (never) and 4 (very often) [9, 10]. In the BAI, each item is scored on a 4-point Likert scale ranging between 0 (none) and 3 (severe) [12], and the sum of each item gives an total score, and there is a significant correlation between a high score and severity of the anxiety [13].

Statistical Analysis

In descriptive statistics, mean, standard deviation (SD), median, minimum and maximum values, frequency and ratio were used. The normal distribution of the data was analyzed using the Kolmogorov-Smirnov test. Quantitative independent data were analyzed using the Kruskal-Wallis test and the Mann-Whitney U test. Qualitative, independent data were analyzed using the Chi-square test, and when the conditions for the Chi-square test were not met, Fisher's exact test was used. All tests were conducted using SPSS version 26.0 (IBM, USA). A p-value below 0.05 was considered statistically significant.

Results

Most of the participants were between 20 and 40 years old (Table 1). Nurses constituted the majority of the participants, followed by physicians, security, staff working in patient transport and cleaning staff and patient data entry staff (Table 1). Most of the participants were university graduates and practiced their profession for the first five years (Table 1). Most of the participants did not have any kids and most of them were not living with a person older than 65 years in their houses (Table 1). Most of them did not have any chronic conditions (Table 1). Most of the participants were working during the COVID-19 pandemic, did not have lung tomography and gave throat swab sample due to COVID-19 (Table 1). Most of the participants were not on sick leave and neither themselves nor their relatives were infected with COVID-19 (Table 1). Most of the participants lived in residence their usual place of residence during the pandemic (Table 1). Most of the participants did not receive any psychiatric treatment or did not plan to receive psychiatric support during or after the pandemic (Table 1). Mean PSS and BAI scores of the participants 19.7 ± 6.4 and 13.4 ± 14.0 , respectively. The most pronounced apprehension of the participants was infecting their relatives, which was followed by being unable to find personal protection gears and disturbances in salary payments (Table 1). The mean age of the physicians and nurses was significantly higher than that of the other staff ($p < 0.05$), however, there were no significant differences between the mean age of physicians and nurses ($p > 0.05$; Table 2). The rate of female gender among nurses was significantly higher than that of physicians and other staff ($p < 0.05$). The gender distribution among the doctor and other staff groups did not differ significantly ($p > 0.05$; Table 2). The educational status of physicians was significantly higher than that of nurses and other personnel ($p < 0.05$), and the educational status of nurses was also significantly higher than that of other staff ($p < 0.05$; Table 2). The duration of the profession did not differ significantly between the physicians, nurses and other staff ($p > 0.05$; Table 2). There were no significant differences in the marital status distribution between physician, nurse and other staff groups ($p > 0.05$; Table 2).

Table 1. Demographic data and distribution of participants' responses to questions regarding COVID-19, PSS and BAI scores

	n (%)	
Age (Years)	20-30	97 (47.8)
	31-40	78 (38.4)
	41-50	26 (12.8)
	51-65	2 (1.0)
Gender	Male	108 (53.2)
	Female	95 (46.8)
Profession	Physician	34 (16.7)
	Nurse	72 (35.5)
	Patient data entry staff	30 (14.8)
	Staff working in patient transport and cleaning staff	32 (15.8)
	Security	35 (17.2)
Educational status	Primary school	3 (1.5)
	Secondary school	11 (5.4)
	High school	63 (31.0)
	Junior college	25 (12.3)
	University	101 (49.8)
Years in profession	0-5	94 (46.3)
	6-10	60 (29.6)
	11-15	27 (13.3)
	≥16	22 (10.8)
Marital status	Married	100 (49.3)
	Single	103 (50.7)
Presence of children	No	125 (61.6)
	1	36 (17.7)
	≥2	42 (20.7)
Living with	Alone	45 (22.2)
	Spouse/Partner	39 (19.2)
	Spouse and kids	69 (34.0)
	Parents	50 (24.6)
Living with someone older than 65 years	(-)	184 (90.6)
	(+)	19 (9.4)
Smoking status	(-)	93 (45.8)
	Rarely	33 (16.3)
	Regularly	77 (37.9)
Presence of chronic disease	(-)	176 (86.7)
	(+)	27 (13.3)

	Min-Max	Median	Mean ± SD /n (%)
Have you had lung tomography due to COVID-19?	(-)		116 (57.1)
	(+)		87 (42.9)
Have you given a throat swab sample due to COVID-19?	(-)		82 (40.4)
	(+)		121 (59.6)
Were you on sick leave due to COVID-19?	(-)		179 (88.2)
	(+)		24 (11.8)
Did you get COVID-19 during the pandemic period?	(-)		175 (86.2)
	(+)		28 (13.8)
Did any of your first degree relatives had COVID-19?	(-)		184 (90.6)
	(+)		19 (9.4)
Where did you reside during the pandemic?			
Usual residence			149 (73.4)
Hotel or guesthouse			17 (8.4)
Isolated myself at home			33 (16.3)
I took my relatives away from home			4 (2.0)

Have you ever received or are you receiving any psychiatric treatment?	(-)		181 (89.2)
	(+)		22 (10.8)
Would you like to get psychiatric support during or after pandemic?	(-)		144 (70.9)
	(+)		59 (29.1)
PSS score	2.0 - 39.0	20.0	19.7 ± 6.4
BAI score	0.0 - 63.0	10.0	13.4 ± 14.0
What worries you the most during the pandemic period?			
Getting sick	(-)		96 (47.3)
	(+)		107 (52.7)
Infesting my relatives	(-)		27 (13.3)
	(+)		176 (86.7)
Not being able to find personal protection equipment (Mask, glasses etc.)	(-)		138 (68.0)
	(+)		65 (32.0)
Not getting support from the management	(-)		131 (64.5)
	(+)		72 (35.5)
Salary payments	(-)		134 (66.0)
	(+)		69 (34.0)

BAI: Beck's anxiety inventory, PSS: Perceived stress scale

Table 2. Distribution of general characteristics of participants by profession

		Physician (n (%))	Nurse (n (%))	Other staff (n (%))	P value
Age (Years)	20-30	18 (52.9)	48 (66.7)	31 (32.0)	0.000
	31-40	8 (23.5)	18 (25.0)	52 (53.6)	
	41-50	6 (17.6)	6 (8.3)	14 (14.4)	
	51-65	2 (5.9)	0 (0.0)	0 (0.0)	
Gender	Male	20 (58.8)	23 (31.9)	65 (67.0)	0.000
	Female	14 (41.2)	49 (68.1)	32 (33.0)	
Educational status	Primary school	0 (0)	0 (0)	3 (3.1)	0.000
	Secondary school	0 (0)	0 (0)	11 (11.3)	
	High school	0 (0)	16 (22.2)	47 (48.5)	
	Junior college	0 (0)	12 (16.7)	13 (13.4)	
Years in profession	University	34 (100.0)	44 (61.1)	23 (23.7)	0.084
	0-5	17 (50.0)	37 (51.4)	40 (41.2)	
	6-10	8 (23.5)	24 (33.3)	28 (28.9)	
	11-15	1 (2.9)	5 (6.9)	21 (21.6)	
Marital status	≥16	8 (23.5)	6 (8.3)	8 (8.2)	0.072
	Married	17	28 (38.9)	55 (56.7)	
Presence of children	Single	17	44 (61.1)	42 (43.3)	0.013
	No	26 (76.5)	48 (66.7)	51 (52.6)	
Living with	1	7 (20.6)	12 (16.7)	17 (17.5)	0.000
	≥2	1 (2.9)	12 (16.7)	29 (29.9)	
	Alone	9 (26.5)	25 (34.7)	11 (11.3)	
	Spouse/Partner	20 (58.8)	8 (11.1)	11 (11.3)	
Living with someone older than 65 years	Spouse and kids	4 (11.8)	21 (29.2)	44 (45.6)	0.003
	Parents	1 (2.9)	18 (25.0)	31 (32.0)	
	(-)	34 (100.0)	69 (95.8)	81 (83.5)	
	(+)	0 (0.0)	3 (4.2)	16 (16.5)	
Smoking status	(-)	17 (50.0)	36 (50.0)	40 (41.2)	0.630
	Rarely	4 (11.8)	13 (18.1)	16 (16.5)	
	Regularly	13 (38.2)	23 (31.9)	41 (42.3)	
Presence of chronic disease	(-)	29 (85.3)	62 (86.1)	85 (87.6)	0.927
	(+)	5 (14.7)	10 (13.9)	12 (12.4)	

Statistical analysis: Chi-Square test

Table 3. Distribution of participants' answers by profession to questions regarding COVID-19, PSS and BAI scores

		Physicians (mean ± SD / n (%))	Median	Nurses (mean ± SD / n (%))	Median	Other staff (mean ± SD / n (%))	Median	P value
Have you had lung tomography due to COVID-19?	(-)	23 (67.6)		33 (45.8)		60 (61.9)		0.046 ^{x2}
	(+)	11 (32.4)		39 (54.2)		37 (38.1)		
Have you given a throat swab sample due to COVID-19?	(-)	16 (47.1)		28 (38.9)		38 (39.2)		0.686 ^{x2}
	(+)	18 (52.9)		44 (61.1)		59 (60.8)		
Were you on sick leave due to COVID-19?	(-)	28 (82.4)		60 (83.3)		91 (93.8)		0.058 ^{x2}
	(+)	6 (17.6)		12 (16.7)		6 (6.2)		
Did you get COVID-19 during the pandemic period?	(-)	26 (76.5)		54 (75.0)		95 (97.9)		0.000 ^{x2}
	(+)	8 (23.5)		18 (25.0)		2 (2.1)		
Did any of your first degree relatives had COVID-19?	(-)	32 (94.1)		61 (84.7)		91 (93.8)		0.100 ^{x2}
	(+)	2 (5.9)		11 (15.3)		6 (6.2)		
Where did you reside during the pandemic?								
Usual residence		25 (73.5)		51 (70.8)		73 (75.3)		0.812 ^{x2}
Hotel or guesthouse		2 (5.9)		4 (5.6)		11 (11.3)		
Isolated myself at home		7 (20.6)		17 (23.6)		9 (9.3)		
I took my relatives away from home		0 (0.0)		0 (0.0)		4 (4.1)		
Have you ever received or are you receiving any psychiatric treatment?	(-)	27 (79.4)		63 (87.5)		91 (93.8)		0.057 ^{x2}
	(+)	7 (20.9)		9 (12.5)		6 (6.2)		
Would you like to get psychiatric support during or after pandemic?	(-)	19 (55.9)		46 (63.9)		79 (81.4)		0.005 ^{x2}
	(+)	15 (44.1)		26 (36.1)		18 (18.6)		
PSS score		19.6 ± 7.1	20.0	22.7 ± 5.8	21.0	17.5 ± 5.8	18.0	0.000 ^k
BAI score		16.4 ± 15.1	11.5	17.0 ± 14.8	12.0	9.6 ± 12.1	4.0	0.000 ^k
What worries you the most during the pandemic period?								
Getting sick	(-)	17 (50.0)		30 (41.7)		49 (50.5)		0.492 ^{x2}
	(+)	17 (50.0)		42 (58.3)		48 (49.5)		
Infecting my relatives	(-)	6 (17.6)		11 (15.3)		10 (10.3)		0.460 ^{x2}
	(+)	28 (82.4)		61 (84.7)		87 (89.7)		
Not being able to find personal protection equipment (Mask, glasses etc.)	(-)	17 (50.0)		43 (59.7)		78 (80.4)		0.001 ^{x2}
	(+)	17 (50.0)		29 (40.3)		19 (19.6)		
Not getting support from the management	(-)	12 (35.3)		38 (52.8)		81 (83.5)		0.000 ^{x2}
	(+)	22 (64.7)		34 (47.2)		16 (16.5)		
Salary payments	(-)	23 (67.6)		39 (54.2)		72 (74.2)		0.024 ^{x2}
	(+)	11 (32.4)		33 (45.8)		25 (25.8)		

^{x2}: Chi- square test; ^k: Kruskal- Wallis test.

The number of children of the participants from other staff group was significantly higher than that of the nurses and physicians ($p < 0.05$), while there was no significant difference between the number of children of the physicians and nurses ($p > 0.05$; Table 2). The ratio of nurses who were living alone was significantly higher than the physician and other staff groups ($p < 0.05$), while the ratio of physicians who were living alone was significantly higher than the other staff group ($p < 0.05$; Table 2). The ratio of participants in the other staff group living with someone over 65 years of age at home was significantly higher than the nurses and physicians ($p < 0.05$), however, there was no significant difference between physicians and nurses ($p > 0.05$, Table 2). On the other hand, smoking status and presence of a chronic disease did not differ significantly between physicians, nurses and participants in other staff group ($p > 0.05$; Table 2). The rate of having chest CT in nurses due to COVID-19 was significantly higher than that of physicians and other staff ($p < 0.05$), while no significant difference was observed between physicians and other participants ($p > 0.05$; Table 3). Throat swab sampling rate, as well as the rate of sick leave did not differ significantly between the physicians, nurses and other

participants ($p > 0.05$; Table 3). The COVID-19 infection rate during the pandemic period among the physicians and nurses was significantly higher than among other personnel ($p < 0.05$), however, no significant differences were observed between the physicians and the nurses ($p > 0.05$; Table 3). There were no differences between the participant groups with regards to the distribution of place of residence during the pandemic period ($p > 0.05$; Table 3). The rates of receiving psychiatric support between the doctors, nurses and other staff did not differ significantly ($p > 0.05$; Table 4). The rate of the willingness of physicians and nurses to get psychiatric support was significantly higher than that of other personnel ($p < 0.05$), while there was no significant difference between the doctors and nurses ($p > 0.05$; Table 3). The PSS scores of the physicians and nurses were significantly higher than that of other staff ($p < 0.05$), and the PSS scores of the nurses were significantly higher than that of physicians ($p < 0.05$; Table 3). The BAI scores of the physicians and nurses were significantly higher than that of other staff ($p < 0.05$), while there were no significant differences between the physicians and nurses ($p > 0.05$; Table 3).

The rate of worry about being sick during the pandemic period did not differ significantly between the groups of participants ($p > 0.05$). Moreover, there was no significant difference between the participants in terms of worrying about infecting their relatives during the pandemic ($p > 0.05$; Table 3). The rate of using personal protection gears by physicians and nurses was significantly higher than that of other personnel, and they were more concerned about being unable to find enough adequate personal protection gears in the future ($p < 0.05$) while no difference between physicians and nurses ($p > 0.05$; Table 3). Physicians and nurses were more anxious about getting support from management than other staff ($p < 0.05$), while no difference was observed between the physicians and nurses ($p > 0.05$; Table 3). Nurses were more anxious about the salary payments than the other staff ($p < 0.05$), while no difference was observed between the physicians and nurses ($p > 0.05$; Table 3).

When considering BAI scores, the ratio of female participants (59.4%) with a BAI score of ≥ 16 was significantly higher than that of participants with a BAI score of < 16 (40.6%; $p < 0.05$ (Chi-square test)). On the other hand, in the group with a BAI score of ≥ 16 , educational status was significantly higher than in the group with a BAI score < 16 ($p < 0.05$ (Chi-square test)). However, there was no association between BAI scores and either age, duration of the profession, marital status, presence of children, accommodation status of the participant with someone, smoking status, or presence of chronic disease ($p > 0.05$ (Chi-square test)).

The PSS score of the participants was evaluated considering the score of 20, and it was revealed that the ratio of female individuals in the group with a PSS score ≥ 20 was significantly more pronounced higher than in the group with a PSS score < 20 ($p < 0.05$ (Chi-square test)). Moreover, the educational status was significantly higher in the individuals with a PSS score ≥ 20 than in the group with a PSS score < 20 ($p < 0.05$ (Chi-square test)). In addition, the ratio of the single individuals was significantly higher in the group with a PSS score ≥ 20 than in the group with a PSS score < 20 ($p < 0.05$ (Chi-square test)). However, there was no association between the PSS scores and age, either duration of the profession, presence of children, accommodation status of the participant with someone, smoking status, or presence of chronic disease ($p > 0.05$ (Chi-square test)).

Discussion

The COVID-19 pandemic is likely one of the most challenging situations around the world. After the first confirmed COVID-19 case on March 11, 2020 in Turkey, the healthcare system has undergone rapid transformations, as has occurred in other countries around the world. Most of the inpatient clinics have been turned into COVID-19 units in order to increase the bed capacity for COVID-19 patients, and most of the physicians with unrelated specialities have started to work in these units in the frontline, and non-emergency leaves have been cancelled for months for the healthcare staff. Under these conditions, healthcare workers had to put their greatest effort into their services and also suffered not only from physical fatigue due to long working hours, but also from psychological and mental

pressure.

Research about the psychological stress during the severe acute respiratory syndrome (SARS) epidemic in 2003 and the H1N1 pandemic in 2009 revealed that healthcare workers experienced stress and stress-related conditions [14-17]. The most pronounced emotional stressors that harm themselves or their relatives are fear and anxiety of working in a hospital [18, 19]. Similarly, the Middle East respiratory syndrome-coronavirus (MERS-CoV) epidemic has caused elevated stress among healthcare workers [20]. Previously, Li et al. indicated that depression and anxiety were observed in 21.3% and 19.0% of the frontline healthcare workers at the beginning of the COVID-19 outbreak [21]. In another study among 1257 healthcare workers, the prevalence of depression, anxiety, insomnia and distress were 0.4%, 44.6%, 34.0% and 71.5%, respectively [22]. Moreover, Morgantini et al. reported that 51% of healthcare workers suffer from professional burnout, and this was associated with various factors including work impacting household activities, exposure to COVID-19 patients and making life prioritizing decisions [23].

In our study, we observed that physicians and nurses had higher BAI and PSS scores than other staff, and scores of nurses were significantly higher than the physicians. This may be due to the fact that nurses are always in close contact with a variety of patients with various illnesses, with different socio-economic status and perform procedures including blood sampling and throat swab sampling, therefore, they are in the group with the highest risk of having COVID-19 [24]. The healthcare workers who are most in contact with the patient and most at risk should be considered more during the infectious disease outbreaks and should be supported psychologically [25]. Moreover, gender and educational status were found to be significantly associated with higher BAI and PSS scores, the reason for this might be that the majority of the female participants were in the group of nurses, and it is likely to have contributed to the identification of the association between the anxiety and stress and gender. Moreover, the reason that the higher educational status was associated with the higher BAI and PSS scores can be attributed to the fact that the individuals with higher educational status were more aware of the risks and therefore, had higher BAI and PSS scores.

In conclusion, frontline nurses and physicians experience anxiety and stress more than other workers in other professions in hospitals. Extensive measures at both organizational and national levels are required to improve the psychological state of frontline healthcare workers during the COVID-19 pandemic.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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